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LESSONS ON TOMATOES FOR RURAL SCHOOLS.[1]

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INTRODUCTION.

Importance.—The tomato has come to be looked upon as one of the most important truck crops. Its value as an article of food and the wide range in which it may be grown have made it both a commercial and a home garden crop of high rank.

Educational value.—The many phases involved in growing, harvesting, and marketing the crop give it value as an educational subject. This has been demonstrated in recent years by its utilization as a club project activity by young people. It is with a view of introducing into the schools in a definite way the study of this important plant that these lessons are outlined. Each lesson topic affords ample work for one or more recitation periods, and should be taught at the season of year indicated.

Practical exercises.—The principles set forth in each lesson should be emphasized and demonstrated by the pupils in the growing of tomatoes for profit under proper supervision. This is dealt with in more detail elsewhere.

References.—The publications referred to may be had from the U. S. Department of Agriculture, Washington, D. C., so long as available. Teachers and pupils should write to the State college of agriculture for publications on the subject. Let it be remembered that the classroom work can be made most effective only when a liberal use is made of supplementary literature. At the very beginning of the school year the teacher and pupils should secure all the available reference literature on the subject.

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[1] Prepared under the direction of C. H. Lane, Chief Specialist in Agricultural Education.

Note.—This bulletin is of interest to teachers of southern rural schools.

Correlations.—In connection with each lesson topic some suggestions are made as to the utilization of the subject in vitalizing the other subjects in the school curriculum. These suggestions are not intended as a part of each lesson, but should be worked out in connection with the recitations in the other school subjects. It is hoped that the teachers will take advantage of these suggestions and elaborate them to meet local needs.

Note to the teacher.—To make the teaching of the lesson topics of this publication effective, three points must be kept in mind: (1) A monthly or seasonal sequence plan should be followed in the presentation of topics; (2) simple classroom exercises should be performed to illustrate and emphasize the principles contained in the lesson topics; (3) members of the class in agriculture should carry on home work or club work with tomatoes for profit. To have educational value this home work or club work should meet the following requirements:[1] (1) The work of growing tomatoes should be a part of the instruction in agriculture; (2) a definite plan should be followed in the growing of tomatoes; (3) the parents should agree to and approve the home work of the pupils; (4) the work should be carefully supervised by some competent person; and (5) detailed records of labor, methods, expenditures, yields, and incomes should be kept and reported upon in writing by the pupils.

LESSON ONE.

TOPIC: HISTORY AND IMPORTANCE.

MONTH: SEPTEMBER.

Lesson outline.[2]—History: The tomato is native to South America, having been grown by the original inhabitants. It belongs to the nightshade family, and for that reason was long thought to be poisonous. It is only in the last hundred years that it has come into general use. It is adapted to a wide range of climatic and soil conditions, but flourishes best in a mild climate and on a well-drained rich loam soil with a clay subsoil.

The tomato belongs to the same order of plants as do peppers and eggplants. While the real kinship of the tomato to these plants is not very close, botanically speaking, yet apparently they are quite closely related and might be classed as cousins. They require much the same cultivation and they are subject to some of the same pests. The same general instructions with reference to starting in hotbeds, hardening off in cold frames, transplanting and cultivating for tomatoes, are applicable to peppers and eggplants.

Importance: Great quantities of tomatoes are grown for home use and to be sold on the American markets. Thousands of acres are planted annually for canning, for soup, and for catsup. The home garden always contains a few tomato plants. The fruit is now so popular that hundreds of greenhouses are devoted to its culture to supply the trade during the winter or cooler seasons of the year. The census of 1910 shows the value of the tomato crop to be $13,707,929.

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[1] The term "home project," as used by school officers in certain sections of the United States, involves the same requirements as enumerated in this connection.

[2] The statements given in each lesson outline are based largely upon Farmers' Bulletins Nos. 220 and 642.

Study questions: In what respects are tomato plants, eggplants, and pepper plants alike? In what respects unlike? In what respects are the fruits of these plants alike? Unlike? Compare the seeds of each. For what purposes are tomatoes grown in the community—market, canning factories, home use? In what forms do canning-club members dispose of their products?

References.—Farmers' Bul. 220.

Practical exercises.—Make a study of the types and varieties of tomatoes grown in the community. For this purpose use tables similar to the following:

Community survey of tomatoes, peppers, and eggplants.

	Variety.	Number of homes at which grown.	Special uses.	Early.	Late.
TOMATO.					
Commercial Group					
Preserving Group					
Currant Group					
PEPPERS.					
Pungent fruited					
Mild fruited					
EGGPLANTS.					
Black fruited					
Purple fruited					
White fruited					

Correlations.—Require the pupils to prepare tables similar to the foregoing to be used in making the community survey.

Arithmetic: Develop problems on the quantity and value of each of these crops.

History: It is thought that the tomato was carried from Peru to Europe. Locate Peru on the map and compare the climatic conditions of Peru with the Southern States; with the Mediterranean countries.

LESSON TWO.

TOPIC: VARIETIES.

MONTH: SEPTEMBER.

Lesson outline.—There has been developed a wide range of varietal forms (fig. 1) which may be grouped: (1) Commercial, of which there are many sorts, varying as to habit of growth and the character of vine and fruit. Generally the vines are compact, or even decidedly dwarf in habit, fairly productive, and the fruits, though varying as to size and form, are generally of good size, attractive form and color, and well suited for culinary use. (2) Preserving, in which the vines are vigorous and produce a great number of comparatively small fruits very uniformly shaped like cherry, pear, or plum and especially suited for preserving. (3) Currant or grape, in which the vines are more rampant growers, but with smaller stems and leaves and fruit, the latter borne on long stems like those of currants which often carry brilliant, red ripe fruit at the base and are still in blossom at the end.

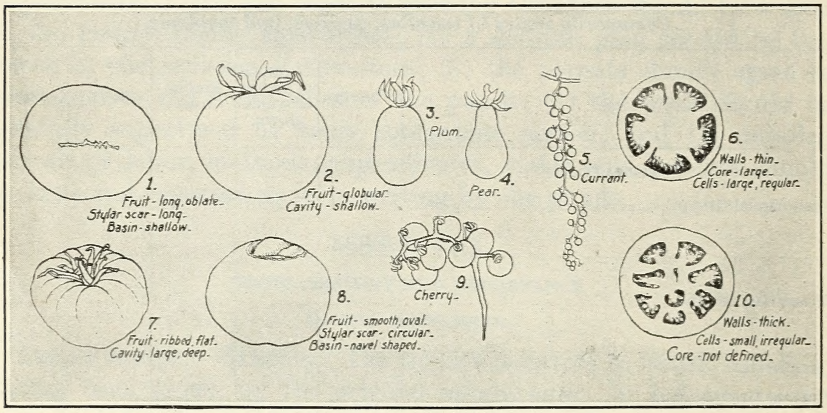

FIG. 1.—Illustrating varieties of tomatoes.

Varieties well adapted to garden conditions and for canning are Earliana, Favorite, Beauty, Bonny Best, Chalks Jewel, Greater Baltimore, Globe, Stone, and Red Rock, the first four being especially suited for the home garden, while the others are of good quality and are especially suited for canning.

Study questions: What varieties of the commercial group are grown? Which have been most successful? What variety is grown by the canning-club members? Have at hand a few specimens of each variety found in the community. Compare them as to size, shape, color. Record answers in a notebook.

References.—Farmers' Buls. 220, pp. 5, 6, 15, 18; and 642, p. 11.

Practical exercises.—Have each member of the class bring a few specimens of each variety of tomatoes grown in the community. These should be used in connection with the study questions. Require the pupils to practice until they are able to recognize each variety at sight.

Correlations.—Language: Have members of the class describe the fruits of the different varieties of tomatoes found in the community.

Drawing: Require the pupils to make drawings of the tomatoes brought to class for study.

LESSON THREE.

TOPIC: HARVESTING.

MONTH: SEPTEMBER.

Lesson outline.—Condition of fruit: If intended for home use, local market, or canning the fruit should be allowed to fully mature on the vine; if for distant market, the fruit should be picked as soon as it begins to turn red.

Picking: Exercise care in handling to avoid bruising or otherwise injuring the fruit. Remove stems to avoid puncturing the ripe fruit.

Packing: Rough, cracked, and deformed fruits should be separated from those intended for market. The best prices are received for those most nearly uniform in size, shape, and color. For a fancy product wrap each fruit in thin paper and pack in half-peck peach or tomato baskets. Fruit for canning should be thoroughly ripe but not soft. Underripe tomatoes give a straw-colored product. Overripe give a mushy product.

For seed, carefully select those plants on which the largest proportion of the crop is of desirable form and color, and save the best fruit from each plant separately. Such seed will give much better results than that from superior individual fruits from plants on which much of the fruit was inferior. Let the fruit get fully ripe, quite past condition for table use. Squeeze out the pulp and seed, throwing away the skins and flesh. Allow the seed to stand in a warm place for 1 to 3 days, according to the weather conditions, then add four or five times its bulk of water. Stir vigorously, allow it to settle, then carefully pour off the water carrying what pulp it will, and repeat until the seed is clean. Spread out not over three seeds deep to dry, stirring repeatedly until dry.

Study questions: For what purposes are tomatoes grown by the pupils and by the community? For local market? For distant market? For canning? What receptacles are used in picking? What care is exercised in preparing tomatoes for the market? What kinds of packages are used for shipping? Do club members and people of the community select their own seed or buy seed in the market? Describe the local method of selecting and saving tomato seed. Record all answers in a notebook.

References.—Farmers' Buls. 220, pp. 13, 14; and 642, pp. 10, 11.

Practical exercises.—(1) The club members and pupils with home work with tomatoes should be busy picking, marketing, and canning tomatoes. Market and can the select fruits and convert the rough, cracked, and uneven fruits into other products. (2) Select and store choice tomato seed from thrifty, productive, healthy plants.

Correlations.—Language: Written work is provided in connection with the study questions.

Drawing: Make sketches of choice tomato plants, of select fruits, and of shipping packages.

Geography: Locate on the map canneries in the community, county, or section. In what distant markets are tomatoes and canned products of club members sold? Over what railroads are they shipped? Locate these on the map.

Arithmetic: Develop problems on the cost, value, and profit or loss of the experiences of club members. Base the exercises on the yearly reports.

LESSON FOUR.

TOPIC: JUDGING.

MONTH: SEPTEMBER.

Lesson outline.—The plant: The "form" of the plant has reference to the habit of growth. Standard varieties differ from dwarf varieties in this respect. In judging the form of a given plant it should be compared with an ideal plant in habit of growth. "Vigor" is the ability of a plant to thrive under suitable conditions. Thriftiness is indicated by the appearance of the plant and the fruit it bears. The "foliage" should be heavy to be able to resist the hot sun of midsummer days, and diseases. "Productiveness" needs no explanation. Great stress should be laid on this quality. Some sorts of tomatoes are more subject to "disease" than others. Hence a place is given in the judging record to this point. Both the plant and its fruit should be examined carefully in this connection.

The fruit: The "shape" of the fruit should be ideal for the variety. "Smoothness" is an important quality. The condition (fig. 2) of the blossom and the stem ends should be included when considering smoothness. The shade of "color" should be uniform and true to the variety. A poor color and an inferior skin are serious objections. The "flesh" should be solid, uniform in color, and should compose a relatively large proportion of the tomato. In other words, the amount of pulp and seed should be relatively small. Each fruit should be evenly "ripe." The "sample" should be uniform as to size, shape, and color.

Study questions: What is the object of judging tomatoes? What is meant by form? Vigor? Shape? Flesh? Pulp? Uniformity of color? Why are grooves objectionable? Why is smoothness of surface desirable?

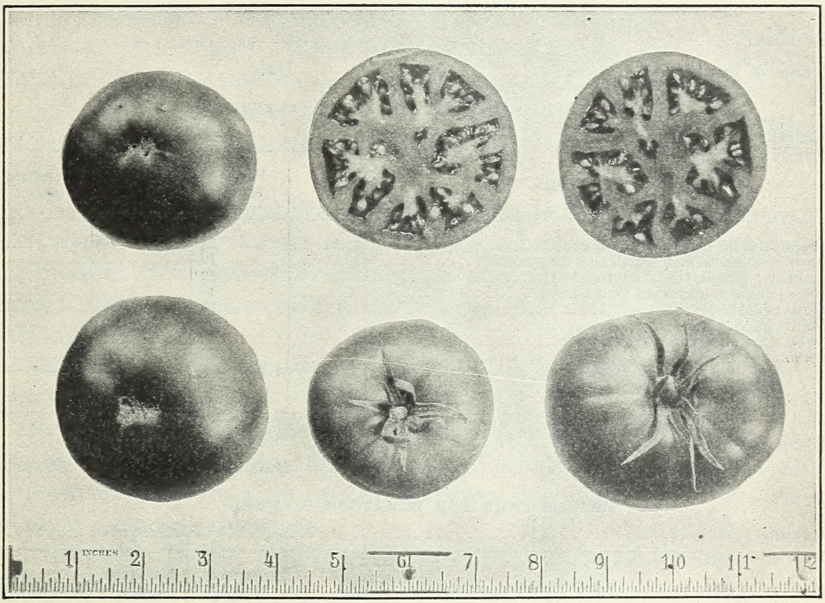

FIG. 2.—Tomatoes having desirable blossom ends and stem ends; also proper proportion of meat and pulp. The range of sizes is desirable.

References.—U. S. Dept. Agr. Bul. 132, p. 37.

Practical exercises.—(1) Go with the members of the class to a near-by tomato plat and score some select plants. If this is impracticable, have each member of the class bring to school a choice plant to be judged. (2) Have each member of the class bring to school five choice tomato fruits to be judged. Each tomato of the group of five should be examined carefully and judged separately. Then the group as a whole should be judged. Pupils should be required to judge and grade miscellaneous lots of tomatoes. Canned tomatoes either in glass or tin should be brought to school and judged. This practice is very important, as it enables the pupils to become familiar with standard or first-class product. The pupils should provide themselves with score cards similar to the following and use them in judging both the plants and the fruits:

SCORE CARD FOR TOMATO PLANT.

Variety..........

Points.	Perfect score.	Student's score.	Corrected score.
Form	10	....	....
Vigor	25	....	....
Foliage	10	....	....
Product (quantity and quality)	35	....	....
Disease (plant and product)	20	....	....
Total	100	....	....

Remarks..........

Name of pupil.......... Date..........

SCORE CARD FOR TOMATOES—PLATE.

Variety..........

Points.	Perfect score.	Student's score.	Corrected score.
Shape (should be ideal for variety)	15	....	....
Blow or blossom end (small scar on smooth)	10	....	....
Stem end (small, slight depression)	10	....	....
Color (uniform and ideal for variety)	15	....	....
Flesh (solidity)	10	....	....
Flesh (uniform color)	10	....	....
Even ripening for individual fruits	15	....	....
Uniformity of sample	15	....	....
Total	100	....	....

Remarks..........

Name of pupil.......... Date..........

SCORE CARD FOR TOMATOES—CANNED.

Variety..........

Points.	Perfect score.	Student's score.	Corrected score.
Solids:			
Fruit, ripe	10	....	....
Fruit, whole or in large pieces	10	....	....
Fruit, uniform in quality and type	10	....	....
Meat, solid and free from green or defects	5	....	....
Flavor, natural	10	....	....
Color, natural	10	....	....
Peeling and coring	5	....	....
Weight, 22 ounces in No. 3 can	15	....	....
Liquid:			
Natural consistency	5	....	....
Weight, 14 ounces in No. 3 can	15	....	....
Container:			
Free from rust or clean	2	....	....
Free from dents or blemishes	2	....	....
Label clean	1	....	....
Total	100	....	....

Remarks..........

Name of pupil.......... Date..........

Correlations.—Written work is provided in preparing score cards. Practice in preparing sheets for the tabulation of facts is an important exercise.

LESSON FIVE.

TOPIC: PLACE OF TOMATOES IN THE ROTATION.

MONTH: SEPTEMBER OR OCTOBER.

Lesson outline.—Tomatoes should not be grown on the same land year after year, as some diseases live over winter in the soil and injure the new crop. The soil should be kept in good condition by including in the rotation leguminous crops. Potatoes, eggplants, and peppers should not follow tomatoes, as some of the same diseases affect all these plants. A cover crop of crimson clover, rye, or oats and vetch should follow the tomato crop. A crop of beans, peas, cabbage, or corn should precede tomatoes.

Study questions.—Why should tomatoes not be grown on the same land year after year? What insect pests and diseases of tomatoes are found in the community? What place does the tomato occupy in the rotation practiced in the community. Name a good rotation course including tomatoes for a garden or a small plat; for field crops.

References.—Farmers' Bul. 642, p. 8. Write to the State college of agriculture for suggestions as to a rotation including tomatoes.

Practical exercises.—Club members and pupils with home work should plant on their plats a cover crop of crimson clover, rye, or oats and vetch.

Correlations.—Written work is provided in preparing statements of rotation courses.

Drawing.—Have members of the class draw to scale an outline of a plat of ground containing three-tenths of an acre. Make three divisions of this and indicate on the divisions the crops of a three-year rotation including tomatoes.

Arithmetic: If the plat containing three-tenths of an acre is 36 yards wide, how long is it? How many square feet in a tenth of an acre? If a tenth of an acre is 33 feet wide, what is its length?

LESSON SIX.

TOPIC: HOTBED AND COLD FRAME.

MONTH: JANUARY OR FEBRUARY.

Lesson outline.—Hotbed: The advantages of the hotbed are: (1) Tender plants may be started early; (2) tender plants started in the hotbed have the start of weeds when transplanted; (3) early vegetables are made possible; and (4) plants grown to considerable size in hotbed are not so subject to attacks of insects and diseases.

The points to be observed in locating the hotbed are (1) nearness to the water supply, (2) convenience to garden and farm buildings, (3) protection from cold winds by buildings, fences, or hedges, and (4) good drainage with southern or southeastern exposure.

The materials used in making a hotbed are (1) manure, a good proportion of which should be fresh and so thoroughly mixed as to be uniform in composition, density, and in the amount of heat produced; (2) a frame with the rear board 4 to 6 inches higher than the front board, and (3) glass or cloth covers for the frame. For a permanent hotbed an excavation or pit 24 to 30 inches deep should be made.

Sowing seed: Sow the seeds in rows 3 to 4 inches apart, one-fourth to one-half inch apart in the row, and cover about one-half inch deep. Water the surface of the soil with a sprinkling can. Keep the hotbed covered with sash or cloth. Raise the sash during the heat of the day for ventilation. Water the bed in the morning on bright days.

Cold frame: (1) The uses of the cold frame are (*a*) the growing of vegetables for winter use, (*b*) the hardening off of the more delicate plants in early spring, and (*c*) starting semihardy plants, as cabbages, cauliflower, etc. (2) The points determining the location of the cold frame are (*a*) protection from north wind such as the south side of a building, fence, or hedge, (*b*) nearness to ample water supply, and (*c*) southern or southeastern exposure. (3) Materials for making a cold frame are (*a*) a frame with a board 12 to 16 inches high on the north side and 6 to 10 inches high on the south side, (*b*) glass, canvas, or cloth covers, and (*c*) very rich, thoroughly pulverized soil.

Study questions: What are the advantages of hotbeds? How are they made? What is the difference between a temporary and a permanent hotbed? Which kind is most commonly used in the community? What plants other than tomatoes are started in hotbeds? Is glass or cloth used for covers? What is the difference between a hotbed and a cold frame? For what are cold frames used? To what extent are cold frames and hotbeds used in the community? Are cold frames used to harden off tomato plants? What other plants are grown in cold frames?

References.—Farmers' Buls. 642, pp. 1–3, pp. 12–15; and 460.

Practical exercises.—(1) Club members and pupils with home work should prepare a compost heap under cover and thoroughly rot the manure to be used in preparing soil for the hotbed. Manure for furnishing heat for hotbed should be fresh, as well-rotted manure does not give off heat. (2) Make frames for the hotbed and for the cold frame. (3) Make the hotbed and prepare to sow tomato seed.

Correlations.—Have the members of the class describe the hotbed used in starting their tomato plants.

Drawing: Draw the frame to scale.

Arithmetic: If tomatoes are planted in rows 4 feet apart and stand 3 feet apart in the row how many plants are required to set one-tenth of an acre? If each plant occupies 2 square inches in the hotbed what should be the area of a hotbed sufficiently large to produce plants to set one-tenth of an acre? Find the cost of material including the cover to make such a frame.

LESSON SEVEN.

TOPIC: SOIL—KIND, PREPARATION, FERTILIZATION.

MONTH: JANUARY OR FEBRUARY.

Lesson outline.—Soil: Select level, well-drained, rich, sandy, or sandy loam soil. Avoid land that has produced diseased tomatoes, cotton, or other crops affected with root knot.

Plow the land to a good depth and pulverize thoroughly by disking, harrowing, dragging, or rolling.

Broadcast barnyard manure before plowing at the rate of 20 tons or more an acre. If well-rotted manure is used it may be applied after plowing, but it should be thoroughly harrowed into the soil. In addition to the barnyard manure apply per acre the following just before setting the tomatoes: 100 to 150 pounds sodium nitrate, 500 to 1,000 pounds of 16 per cent acid phosphate, and 150 to 300 pounds of muriate of potash per acre. Where manure is not used apply 400 to 800 pounds of cottonseed meal per acre in addition to other fertilizers. Broadcast large amounts of fertilizers; drill small amounts. A good formula for tomatoes is 8:2:6 (8 per cent phosphoric acid, 2 per cent ammonia, and 6 per cent potash).

Study questions: What are the principal types of soil found in the community? Which type is used in growing tomatoes and other truck crops? What is the practice as to the preparation of soil for tomatoes? Other vegetable crops? What fertilizers are used for tomatoes? What value has barnyard manure other than furnishing plant food? Why should barnyard manure be plowed into the soil some months before planting time? What are the three essential elements in fertilizers? Name the source of each in the materials suggested in the lesson outline.

References.—Farmers' Buls. 220, pp. 10, 11, 12, 16, 17, 28, 29, 30; 642, pp. 5, 6; 255 and 647.

Practical exercises.—The members of the class that have decided upon growing tomatoes as club work or home work should select the plat, broadcast manure, and plow the land to a good depth. Harrow the land thoroughly. Secure commercial fertilizers. Have everything ready when the time comes to set the plants.

Correlations.—Copy in the class notebook all answers to "study questions." Draw to scale the plat to be used for growing tomatoes.

Arithmetic: Find the cost of barnyard manure used on the plat.

If sodium nitrate contains 16 per cent nitrogen, acid phosphate 16 per cent phosphoric acid, and muriate of potash 50 per cent potash, how many pounds of each in 150 pounds of sodium nitrate, 1,000 pounds of acid phosphate, and 300 pounds muriate of potash? Find the cost of the materials if a pound of nitrogen is worth 17 cents a pound, a pound of phosphoric acid 5 cents, and a pound of potash 5 cents.

LESSON EIGHT.

TOPICS: HARDENING OFF PLANTS; PREPARING LAND AND TRANSPLANTING.

MONTHS: MARCH TO MAY.

Lesson outline.—Hardening off plants. Where plants are grown in a hotbed they should be hardened before being set in the open. This can be done by transferring the plants from the hotbed to the cold frame or by removing the hotbed sash during the day. As the plants become hardened the cover may be kept off at night when there is no danger of frost. Boxes and tin cans may be used for developing the plants.

Preparing land and transplanting: Thoroughly harrow the soil. Mark off the rows about 4 feet apart for horse cultivation; 3 feet apart for hand cultivation. If plants are to be pruned to one or two stems and tied to stakes or trellises, set them 2 to 3 feet apart. If the plants are not to be pruned and staked, set them 3 to 4 feet apart. Before removing plants from the hotbed or cold frame, thoroughly soak the bed in order that considerable soil will adhere to the roots of the plants. Take up plants with trowel or spade and pack in boxes to carry to the field or plat. Set plants in the furrow and pack the soil around them. Finish filling the furrow with a turn plow or hoe.

Study questions: What methods are used to harden plants? Why should plants be hardened before setting in the open? What is the distance between rows? Between plants? Why should the soil of the hotbed or cold frame be thoroughly moistened before plants are removed? Should the soil be moistened around the plants where set in the field? Why should dry soil be spread over the moistened area?

References.—Farmers' Buls. 220, pp. 9, 16; 642, pp. 6, 7; 255, and 647.

Practical exercises.—The members of the class who are growing tomatoes should harden their plants and get them in condition to set in the open. By removing the plants from hotbeds to cold frames (tin cans or boxes), they may be given greater distance and encouraged to grow more rapidly. As a rule the plants should not be set in the open before May. However, in the far South they may be set as early as March or April. In southern Florida planting in the fall is practiced.

Correlations.—Copy in the class notebook answers to "study questions." Develop further problems on the cost of fertilizers and the number of plants required to set given areas. An accurate record of labor, cost of fertilizers, seed, and the like, should be kept in a bound book.

LESSON NINE.

TOPICS: TRAINING, PRUNING, AND CULTIVATING.

MONTH: MAY.

Lesson outline.—Training: Immediately after the plants are set a stake (fig. 3) should be driven down securely by each one of them. For this purpose use saplings, mill edgings, or inch strips. As the plants grow tie them to the stake with soft twine. This is accomplished by looping the string around the stake and tying the tomato plant loosely so as not to interfere with its growth. Frames may be used instead of stakes, but they are much more expensive and no more satisfactory. Frames should be about 18 inches square at the base and 24 inches square at the top. Set the frames before the plants begin to spread.

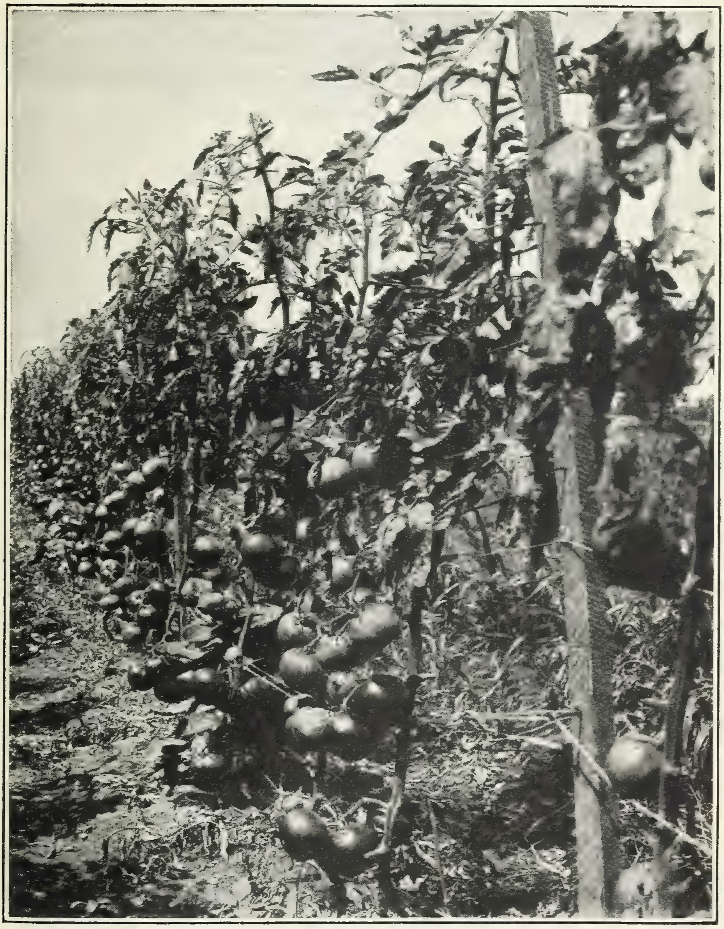

FIG. 3.—Tomato plants properly trained by use of posts and twine.

Pruning: Prune the plants to one or two main stems. Remove all shoots that grow in the axils of the leaves; that is, between the leaves and main stems. To keep the shoots pinched off, go over the plat once every week or 10 days.

Cultivating: Give the tomato plants frequent shallow cultivation to keep down weeds and maintain a soil mulch to prevent evaporation. Cultivate as soon as the soil is sufficiently dry after each rain. Do not allow a crust to form. A small-tooth cultivator is suitable for tomato cultivation. By the use of the hand hoe keep the soil loose and the weeds between the plants down.

Study questions: What materials are used for stakes? Are frames used? How are they made? What points are to be gained by pruning plants to one or two stems and supporting them to stakes? Does the fruit mature earlier? Is the fruit larger? Are the plants and fruits as subject to disease when trained in this way? What are the shoots that develop in the axils of the leaves? When do the fruit stems develop? What is a "mulch?" What is a "soil mulch?" How produced?

References.—Farmers' Buls. 220, pp. 8, 9, 16; 642, pp. 7, 8; 255 and 647.

Practical exercises.—Preparing stakes, making frames, setting stakes or frames, pruning plants and cultivating the plat provide work for the members of the class with tomato plats as home or club work.

Correlations.—Written work is provided by copying in the notebook answers to "study questions."

Drawing: Make sketches of a frame; a properly pruned and staked tomato plant.

Arithmetic: Find the cost of material and labor in staking a tenth of an acre of tomatoes. Find the cost of material and labor in making frames for 200 tomato plants.

LESSON TEN.

TOPIC: PESTS—DISEASES AND INSECTS.

MONTH: MAY.

Lesson outline.—Diseases: Among the principal diseases of tomatoes are blossom-end rot, leaf spot (leaf mold), fruit rot, wilt, and root-knot. To prevent diseases practice a rotation course extending through three or four years and not including tomatoes, eggplants, and peppers more than once in this period. Fertilize and cultivate the plants well to keep them in a thrifty condition. Avoid the use of fresh manure. Pull up and burn all diseased plants when disease first appears. Begin spraying the plants with Bordeaux mixture as soon as they are set out and keep this up at intervals of 10 days for five or six applications. Fruit rot is combated by pruning and training, together with the destruction of diseased fruits. Rotation prevents root rot. Rotation and spraying with Bordeaux are necessary to combat wilt. As a special treatment for blossom-end rot conserve the moisture supply and irrigate if found necessary.

Insects: Among the insects to be combated in growing tomatoes are cutworms, flea-beetle, tomato hornworm, and tomato "fruit worm." Cutworms cut down the young plants as soon as set out. A good remedy is to use poisoned bait before the plants are set out. Dip some green plants such as collard or cabbage leaves, bunches of clover or weeds into a solution of one spoonful of Paris green to a bucketful of water. Scatter these over the plat for two or three days before transplanting. A mash of bran or cottonseed meal may be used for the same purpose. The flea-beetle is a tiny black, jumping beetle which feeds upon the tissue of the leaf either in the cold frame or after transplanting. To combat this insect add to the Bordeaux mixture Paris green or arsenate of lead at the rate of 2 ounces of Paris green or 10 ounces of arsenate of lead to each 10 gallons of Bordeaux. The tomato hornworm is a large green caterpillar, the larva of one of the sphinx moths. Hand picking and killing is the best way to get rid of it. The "fruit worm" in its different generations is the same thing as the cotton bollworm and the bud worm of corn. It likes these plants better than tomatoes. Tomatoes planted near corn or cotton may suffer from this worm. Corn planted in tomatoes will protect the tomatoes, as the worms like the corn better than tomatoes. It injures the tomato by boring into the fruit. Pick off and destroy the worms as well as the infected tomatoes. Spray with arsenate of lead three weeks or more before the fruit ripens and again about a week before ripening spray with Paris green.

Study questions: What tomato diseases are found in the community? How serious has been the damage from diseases? What methods have been employed successfully in combating diseases? What insects found in the community attack tomatoes? To what extent have insects proved injurious? What methods have been employed to successfully combat them? Estimate the damage done to the tomato crop of the community by diseases and insects.

References.—Farmers' Buls. 220, pp. 31, 32; 642, pp. 9, 10.

Practical exercises.—Club members should prepare and have ready stock solutions of lime and of bluestone to be mixed and used to prevent diseases of plants. See Farmers' Bul. 642, p. 10. Spraying should be done before diseases appear. If insects appear, arsenate of lead may be added to the Bordeaux mixture.

Correlations.—Copy in the notebooks replies to the "study questions."

Drawing: Require the pupils to sketch parts of plants and fruits affected by diseases.

Arithmetic: From the estimated damage to the tomato crop by diseases and insects develop problems as to the financial loss due to damage. Problems relating to losses by club members should be given special attention.

CLUB ORGANIZATION.[1]

Rules for beginning work.—(1) Secure a tenth acre of ground. This may be 132 feet long and 33 feet wide, or any other convenient dimensions, provided 4,356 square feet are included. (2) Keep a complete record of the date and the kind of work done and the time used. (3) Keep a record of expenses, charging 10 cents an hour for the club member's work, 5 cents an hour for the work of the horse, and actual cost for all hired work and supplies. Estimate the value of stable manure at $2 a ton or two-horse wagon load. Charge $1 for the rent of the tenth acre of land.

Business showing from tenth acre.—In addition to the detailed report contained in the Daily Record Book each club member must submit the following summary of the year's work:

1. Cost of production:	
(*a*) Rent of land	$1.00
(*b*) Preparation of tenth acre	....
(*c*) Cost of seeds and plants	....
(*d*) Cost of manure and fertilizer	....
(*e*) Cost of cultivation, staking, and pruning	....
(*f*) Cost of baskets and crates	....
2. Cost of canning:	
(*a*) Cost of gathering fruit	....
(*b*) Cost of cans, jars, labels, etc	....
(*c*) Cost of canning, pickling, preserving, etc	....
(*d*) Cost of crates and baskets	....
Total	....
Grand total of costs	....
3. Garden receipts:	
(*a*) Receipts from fresh vegetables	....
(*b*) Estimated value of canned vegetables	....
(*c*) Estimated value of vegetables for home use	....
(*d*) Value of other products of the tenth acre	....
Total value of products	....
Expenses deducted	....
Net profit for year	....
Total yield of tomatoes from tenth acre, pounds	....
Number of pounds, other vegetables	....

	No. 10.	No. 3.	No. 2.	Jars.	Bottles.
No. cans tomatoes					
Other products					

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[1] Information under this heading was furnished by the Office of Extension Work in the South States Relations Service, U. S. Department of Agriculture. For further information on organization of clubs write to the same office or the State college of agriculture.

Canning-club score.—The score for judging the work of club members is as follows:

		Points.
1. Business showing, to include		30
Management of crops	10	
Yield	10	
Profit	10	
2. Quality		30
Of exhibit	15	
Of other products	15	
3. The Daily Record Book		20
4. The history of the season's work		20

(This should be in the form of a pretty booklet made by the girl herself to tell the story of her work.)

COMMUNITY EXHIBITS.

Importance.—Every community should have its fair day. The logical place to hold such a fair is at the school building. The school should be represented. No part of the community fair can be made more instructive and attractive than the canning-club exhibit. The green and canned products of the garden lend themselves to the most striking and artistic arrangements. Looking forward to an exhibit of products and work will prove a great incentive to the pupils.

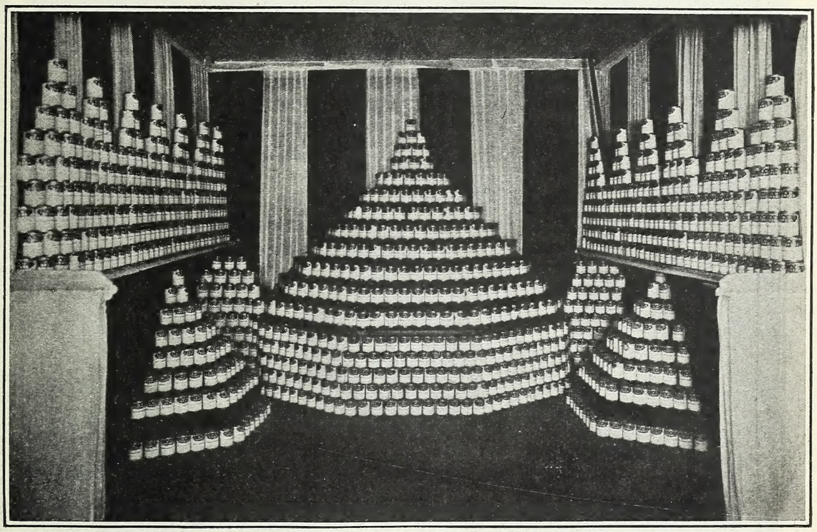

FIG. 4.—Individual canning club exhibit—1,730 cans.

Selecting and arranging the individual exhibits.—(1) Select a plate of five tomatoes uniform in size, shape, color, and stage of ripeness. The fruits should be thoroughly ripe but not overripe. Also select a half-peck basket of tomatoes of the same kind. (2) Select and arrange a sufficient number of tins, glass cans, bottles, and jars of canned tomatoes and other tomato products to make an attractive display (fig. 4). If other vegetables have been put up, choice specimens of these products should be displayed.

While each member of the canning club should have an individual exhibit, all the members of the club should group (fig. 5) their exhibits for the general effect produced. For the group exhibit select a corner or section of the building to be used and arrange the individual exhibits so as to produce the best effect.

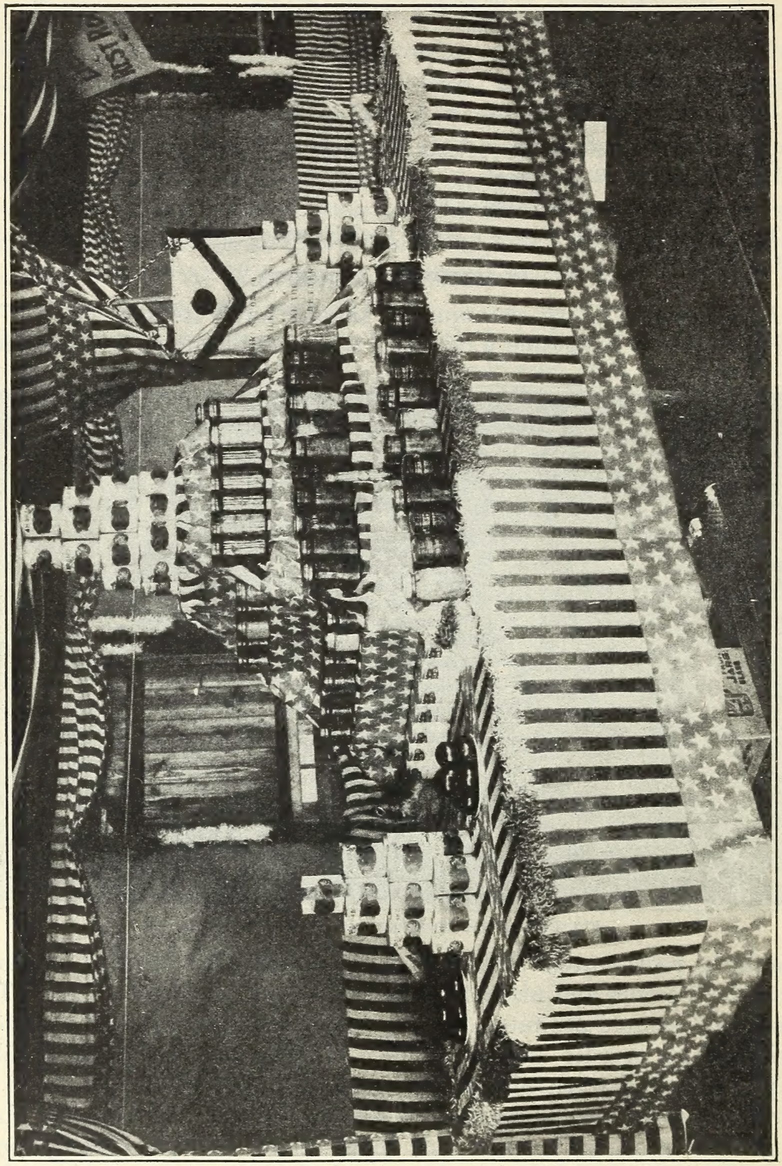

FIG. 5.—A county canning club exhibit showing tomato fruit and canned products artistically arranged.

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